

# Electrical Performance of GPS/WIFI Antenna

Customer/Project	TCL-9296G	Band	GPS/WIFI
Material	FPC	Version	R: A
Check	QIU	Design	
Date	2022-8-9	Confirm by	Eric
SPEED Wireless Communication Technology			

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## 1. Indication

This report summarizes the electrical performance results of the proposed internal antenna to support the Transformer program. The antenna covers GPS/WIFI band.(See Figure1).



Figure 1: Proposed Antenna

## 2. Electrical Performance

### 2.1 Specification

Frequency	1.55GHz-1.63GHz, 2.35G-2.55G, 5G-6G
Impedance	50 Ohm
Return Loss	-4dB Max
Radiation	Omni-directional
Gain(peak)	0 dBi±2dBi
Polarization	Linear.Vertical
P/N	/
Antenna Pattern	PIFA FPC

## 2.2 Matching Circuit Description

The matching circuit that is the customer provides with us.

## 2.3 Return Loss

Return Loss were performed using Agilent E5071C Network Analyzer and the previously described test fixture. A ferrite-loaded coaxial cable was used to mitigate surface currents on the outside of the cabling.

## 2.4 Efficiency & Radiation Patterns

The efficiency of the antenna was measured in the Satimo Communication Technology anechoic chamber. The network card is measured in free space with ThinkPad T61. The chamber provides less than  $-40$  dB reflectivity from 400 MHz through 6 GHz and 25cm diameter spherical quiet zone. The measurement results are calibrated using both dipole and leaky wave horn standards.

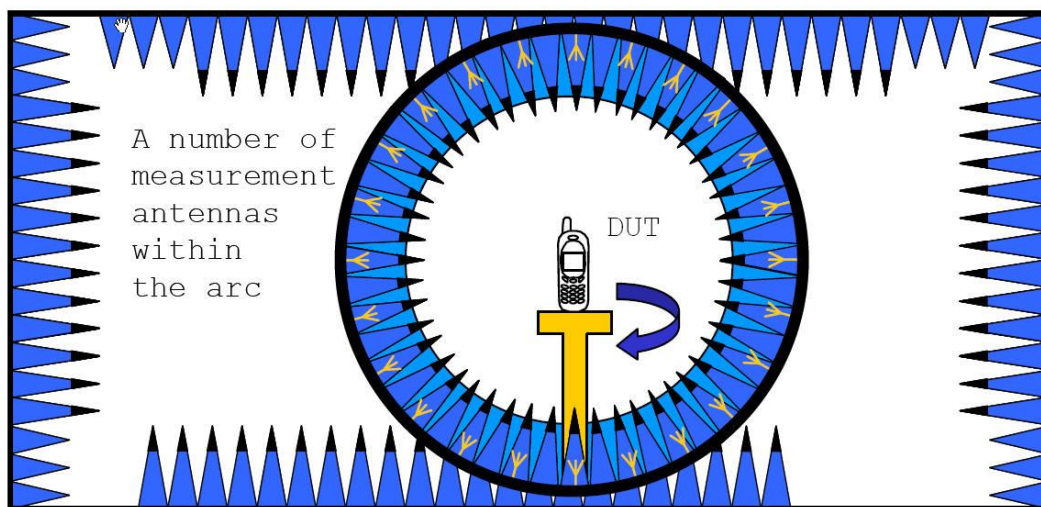
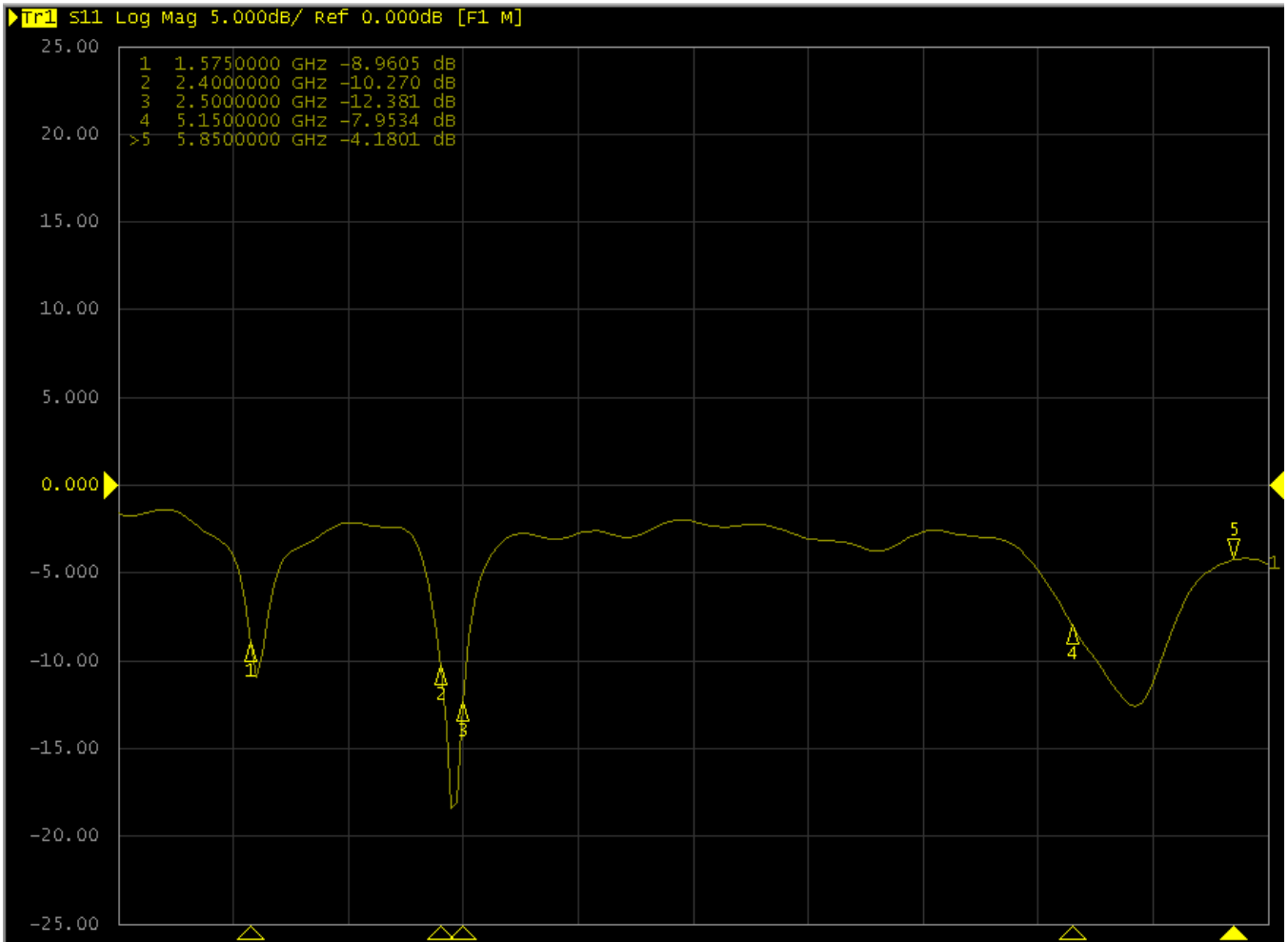


Figure 2 speed chamber system

### 3 Measurement Data

#### 3.2 Return loss

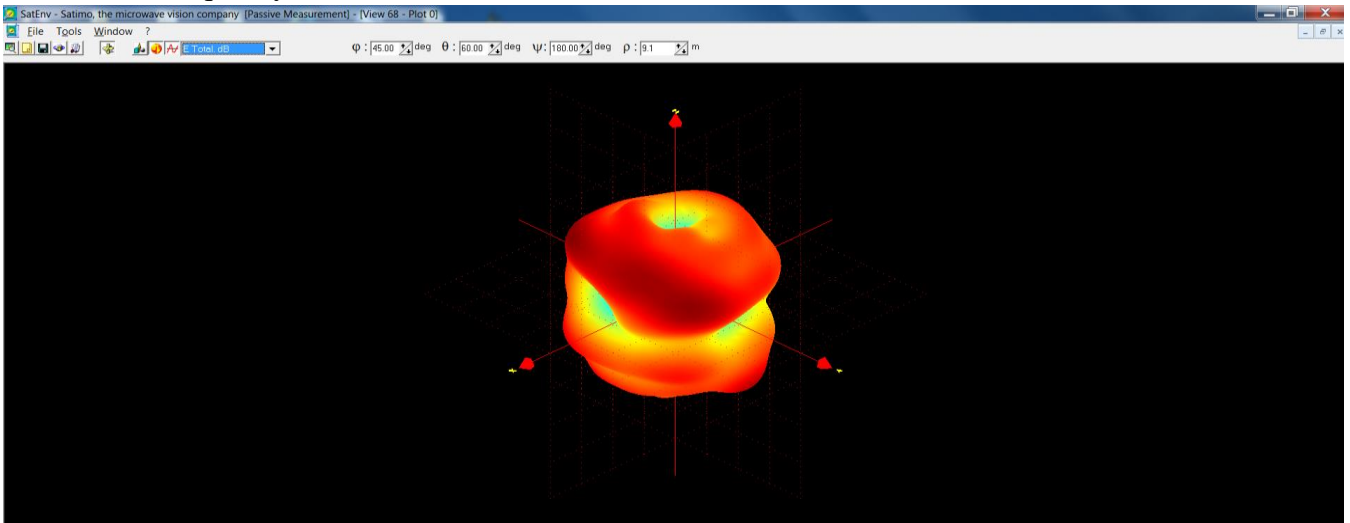


**3.2 GPS/2.4G/5GWIFI - Efficiency**

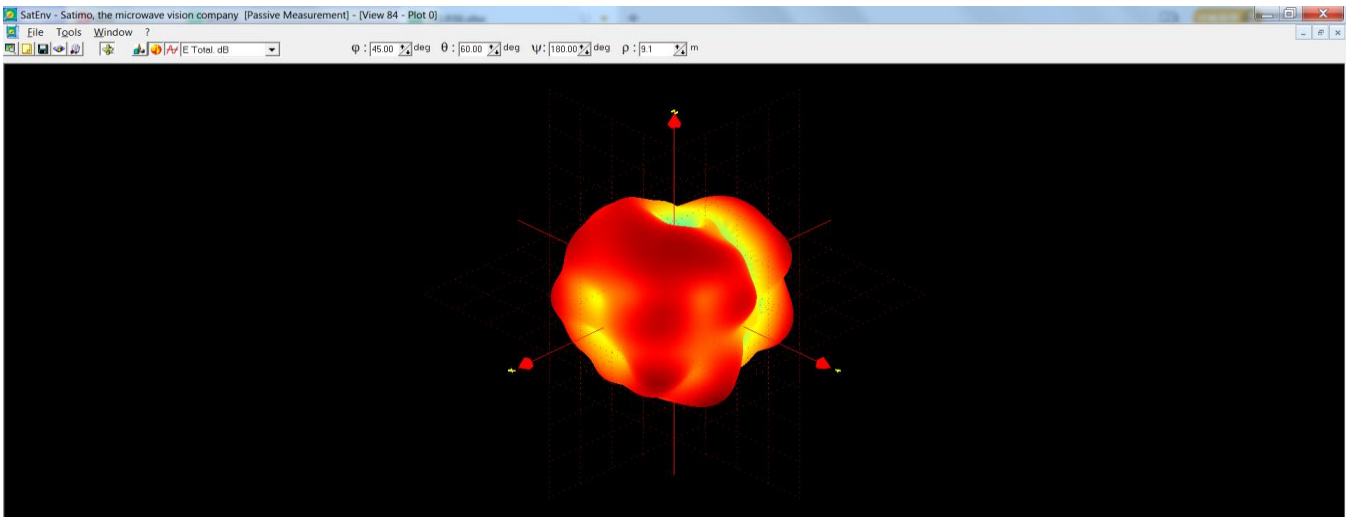
FREQ. (MHz)	Efficiency (%)	Gain (dBi)	FREQ. (MHz)	Efficiency (%)	Gain (dBi)	FREQ. (MHz)	Efficiency (%)	Gain (dBi)
1550	28.4%	-0.5	2350	19.3%	-1.9	5000	23.3%	-0.9
1555	29.3%	-0.4	2360	22.3%	-1.3	5050	26.9%	-0.2
1560	29.4%	-0.4	2370	23.7%	-1.2	5100	30.8%	0.7
1565	30.6%	-0.3	2380	25.6%	-0.8	5150	32.8%	0.9
1570	30.9%	-0.3	2390	27.8%	-0.5	5200	35.1%	1.2
1575	31.8%	-0.3	2400	29.4%	-0.1	5250	35.3%	1.2
1580	32.1%	-0.3	2410	30.1%	0.0	5300	35.5%	1.1
1585	32.3%	-0.4	2420	31.4%	0.3	5350	34.5%	0.9
1590	32.3%	-0.3	2430	33.0%	0.5	5400	35.5%	1.2
1595	31.7%	-0.3	2440	31.9%	0.3	5450	33.8%	1.1
1600	31.2%	-0.4	2450	29.4%	-0.4	5500	32.8%	1.3
1605	30.0%	-0.5	2460	28.8%	-0.7	5550	32.4%	1.3
1610	29.4%	-0.6	2470	29.8%	-0.4	5600	30.1%	1.0
1615	28.4%	-0.7	2480	29.6%	-0.2	5650	27.4%	0.2
1620	28.0%	-0.8	2490	26.9%	-0.5	5700	23.7%	-0.5
1625	27.1%	-0.8	2500	23.8%	-0.9	5750	21.4%	-0.8
1630	26.9%	-1.0	2510	22.5%	-1.0	5800	19.4%	-1.2
			2520	21.5%	-1.1	5850	18.9%	-1.2
			2530	19.5%	-1.4	5900	17.2%	-1.6
			2540	17.2%	-1.7	5950	17.8%	-1.5
			2550	16.1%	-2.0	6000	17.4%	-1.4

### 3.3 Radiation Pattern

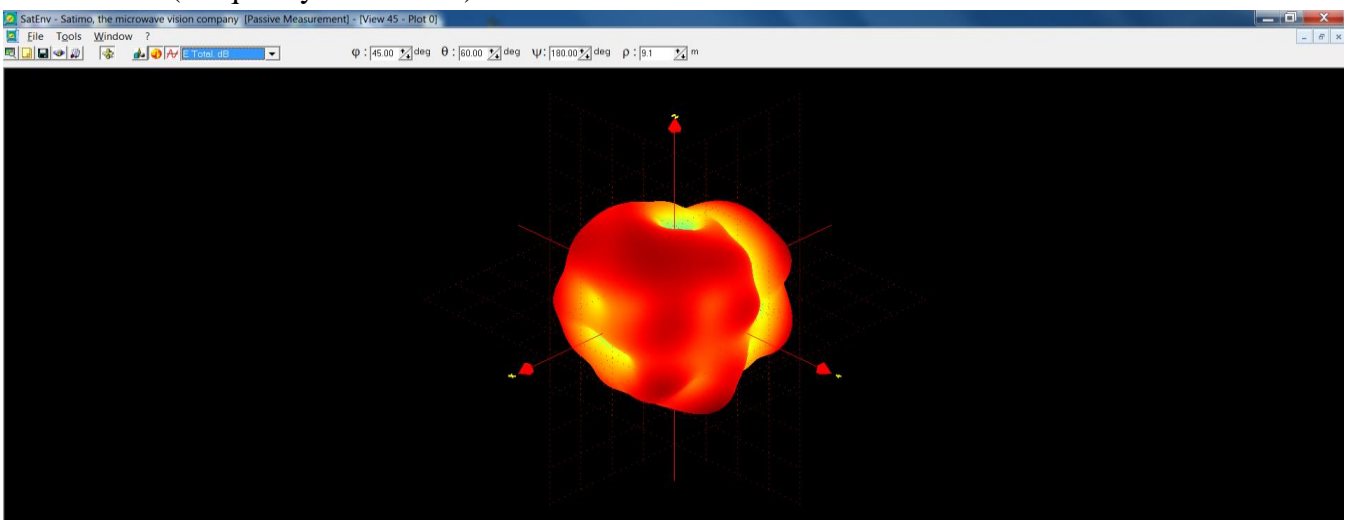
ANT GPS (Frequency=1575MHz)



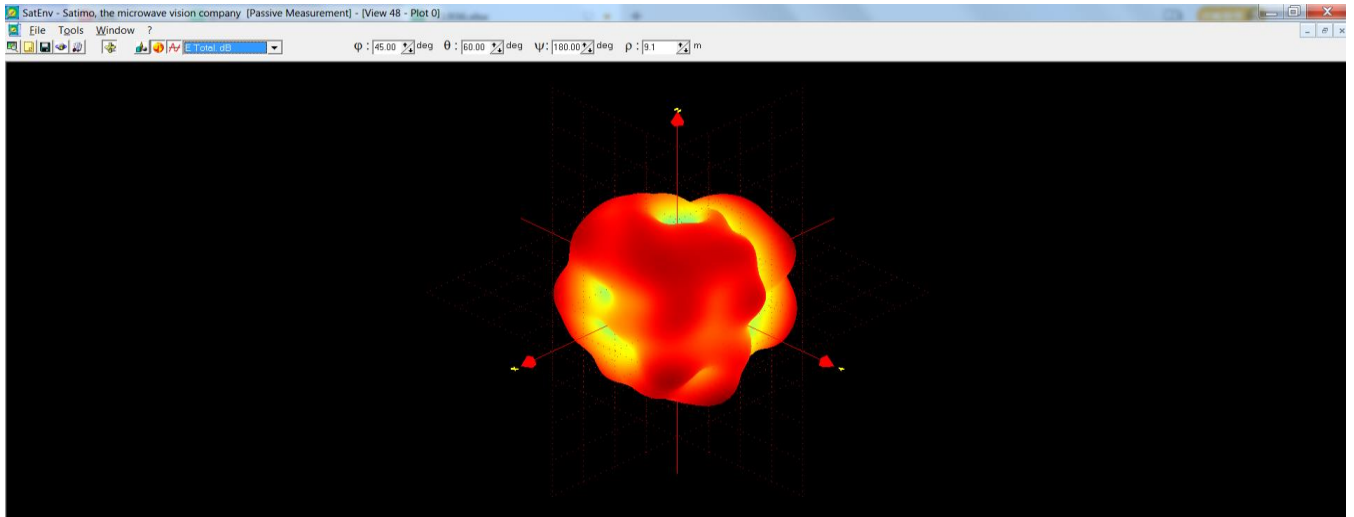
ANT WIFI (Frequency=2400MHz)



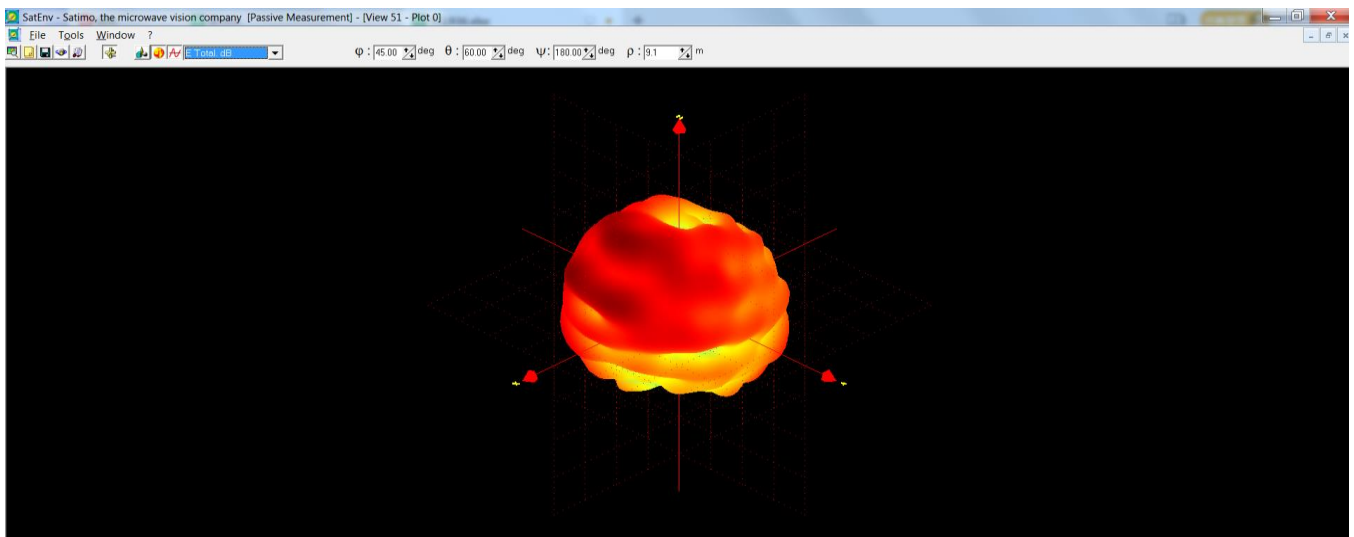
ANT WIFI (Frequency=2440MHz)



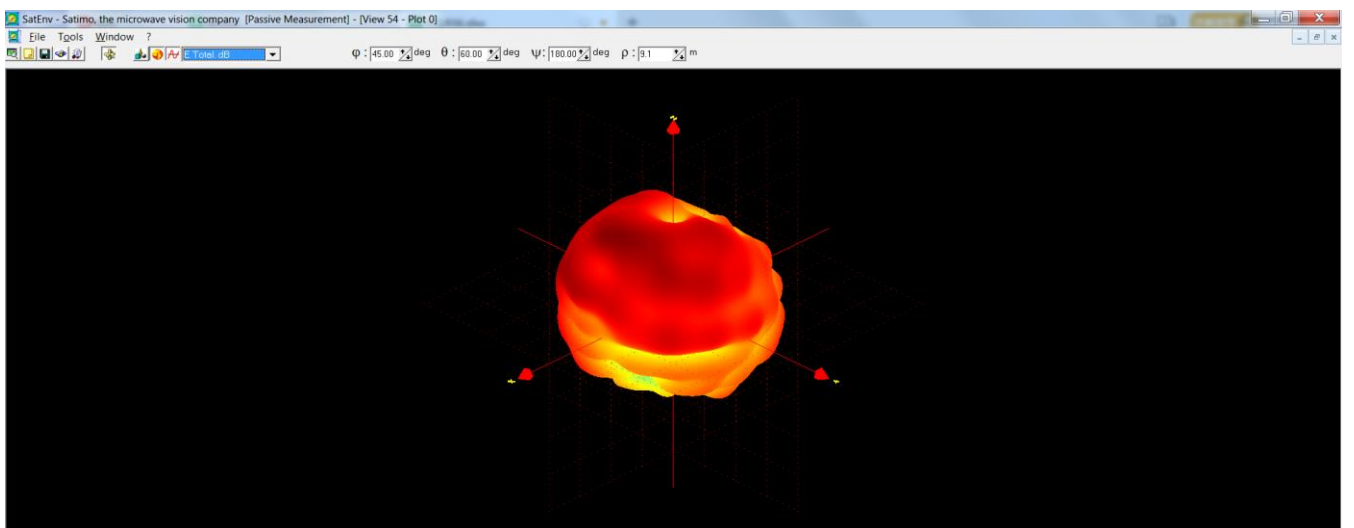
### ANT WIFI (Frequency=2440MHz)



### ANT WIFI (Frequency=5200MHz)

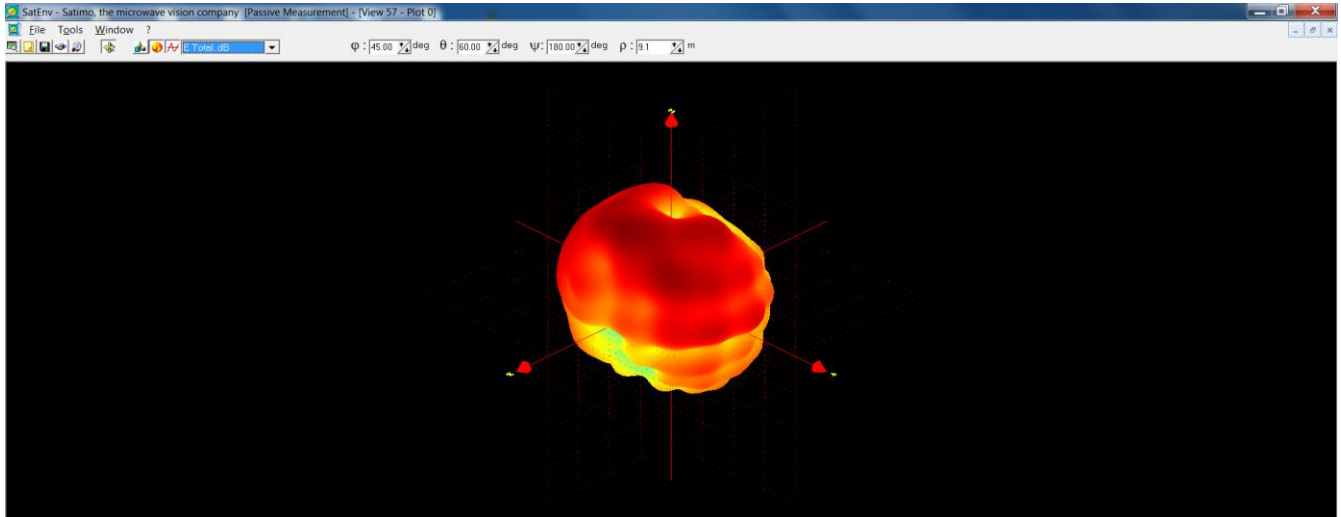


### ANT WIFI (Frequency=5500MHz)





## ANT WIFI (Frequency=5800MHz)



### 4. Suggestions and Conclusion

This report summarizes the electrical performance of GPS/WIFI antenna. The antenna was tested using the customer provided prototype Transformer Modem test fixture. The report shows satisfied RF performance across the band. speed team is looking forward to getting your approval. Thanks for your cooperation.